

CLAIMS

What is claimed is:

1. A bracket for a window lift mechanism, comprising:
a crossbar and transmission housing formed as a single unit, said crossbar and transmission housing including a motor mounting structure, a passage for receiving a drive shaft, a gear cavity, at least one rack guide feature and a slave gear hub portion all formed as a unitary piece.
2. The bracket according to claim 1, wherein said gear cavity includes a gear hub portion disposed therein.
3. The bracket according to claim 1, further comprising a pair of window bracket mounting features.
4. A bracket for a window lift mechanism, comprising:
a crossbar and transmission housing formed as a single unit, said crossbar and transmission housing including a passage for receiving a drive shaft, a gear cavity, at least one rack guide feature and a slave gear hub portion all formed as a unitary piece.

5. A bracket for a window lift mechanism, comprising:

a crossbar and transmission housing formed as a single unit, said crossbar and transmission housing including a motor mounting structure, a passage for receiving a drive shaft, at least one rack guide feature and a slave gear hub portion all formed as a unitary piece.

6. A bracket for a window lift mechanism, comprising:

a crossbar and transmission housing formed as a single unit, said crossbar and transmission housing including a motor mounting structure, a passage for receiving a drive shaft, a gear cavity and a slave gear hub portion all formed as a unitary piece.

7. A bracket for a window lift mechanism, comprising:

a crossbar and transmission housing formed as a single unit, said crossbar and transmission housing including a motor mounting structure, a passage for receiving a drive shaft, a gear cavity and at least one rack guide feature all formed as a unitary piece.

8. A bracket for a window lift mechanism, comprising:

a crossbar and transmission housing formed as a single unit, said crossbar and transmission housing including a motor mounting structure, a gear cavity, at least one rack guide feature and a slave gear hub portion all formed as a unitary piece.

9. A window lift mechanism, comprising:

a crossbar and transmission housing formed as a single unit, said crossbar and transmission housing including a motor mounting structure, a passage for receiving a drive shaft, at least one rack guide feature and a slave gear hub portion all formed as a unitary piece;

a motor mounted to said motor mounting structure, said motor including a drive shaft received in said passage;

a first pinion gear received operably driven by said motor;

a second pinion gear rotatably mounted to said slave gear hub and drivingly engaged with said first pinion gear; and

a dual rack system having parallel toothed racks spaced from one another and each engaging a respective one of said first and second pinion gears, said dual rack system being engaged by said at least one rack guide feature.

10. The window lift mechanism according to claim 9, wherein said crossbar and transmission housing includes a gear cavity, and further comprising a worm gear disposed in said gear cavity and drivably engaged with a worm mounted to said drive shaft, said worm gear being drivably engaged with said first pinion gear.

11. A window lift mechanism, comprising:

a crossbar and transmission housing formed as a single unit, said crossbar and transmission housing including a motor mounting structure, a passage for receiving a drive shaft, at least one rack guide feature and a gear cavity all formed as a unitary piece;

a motor mounted to said motor mounting structure, said motor including a drive shaft received in said passage;

a first pinion gear received operably driven by said motor;

a second pinion gear rotatably mounted to said crossbar and transmission housing; and

a dual rack system having parallel toothed racks spaced from one another and each engaging a respective one of said first and second pinion gears, said dual rack system being engaged by said at least one rack guide feature.

12. A method for assembling a window lift mechanism, comprising the steps of:

mounting a motor to a motor mounting feature of a crossbar and transmission housing, said crossbar and transmission housing including said motor mounting feature, a gear cavity, a passage for receiving a drive shaft, at least one rack guide feature and a slave gear hub portion all formed as a unitary piece;

said motor drivingly connected to a worm;

mounting a worm gear in said gear cavity;

mounting a first pinion gear in driving engagement with said worm gear and mounting a second pinion gear on said slave gear hub portion and in meshing engagement with said first pinion gear;

placing a dual rack system in alignment with said pinion gears; and

applying power to the motor to drive said pinion gears to engage said first and second pinion gears and said at least one rack guide feature with said dual rack system.

13. A method for assembling a window lift mechanism, comprising the steps of:

mounting a motor to a motor mounting feature of a crossbar and transmission housing, said crossbar and transmission housing including said motor mounting feature, a gear cavity, a passage for receiving a drive shaft and at least one rack guide feature all formed as a unitary piece;

said motor drivingly connected to a worm;

mounting a worm gear in said gear cavity in meshing engagement with said worm;

mounting a first pinion gear in driving engagement with said worm gear and mounting a second pinion gear on said crossbar and transmission housing;

placing a dual rack system in alignment with said pinion gears; and

applying power to the motor to drive said pinion gears to engage said first and second pinion gears and said at least one rack guide feature with said dual rack system.

14. A vehicle door comprising:

an outer door panel;

an inner door panel connected to said outer door panel;

a window lift mechanism disposed between said inner and outer door panels and including a pair of spaced racks and a support bracket supporting a pair of pinions in engagement with said pair of spaced racks;

a window mounted to said support bracket, said window including a top edge, a front edge, a rear edge and a bottom edge, one of said front and rear edges being angled so as to generally correspond with a first pillar angle, the other of said front and rear edges being angled so as to generally correspond to a second pillar angle, said first pillar angle being greater than zero degrees from vertical and said bottom edge being generally perpendicular to said one of said front and rear edge, and said pair of spaced racks being generally parallel to said first pillar angle.

15. A method of making dual racks for window lift mechanisms to be used with first and second vehicle doors having different window configurations, comprising:

determining a first radius of curvature for a first window of the first vehicle door;

determining a second radius of curvature for a second window of the second vehicle door;

determining a first required length of travel of said first window;

determining a second required length of travel of said second window;

providing a mold cavity defining a pair of parallel racks each having a plurality of gear teeth, a radius of curvature of said pair of parallel racks being between said first and second radii of curvature of the first and second windows and a length of said racks being sufficient to accommodate a longer of said first and second required lengths of travel of said first and second windows;

injecting molten plastic into said mold cavity; and

removing the molded racks from the mold cavity.

16. The method of claim 15, wherein during molding of the dual racks for the window having a shorter of said first and second required lengths of travel, an insert is provide in said mold cavity to shorten the length of gear teeth on said dual racks.

17. A vehicle door comprising:

an outer door panel;

an inner door panel connected to said outer door panel;

a window lift mechanism disposed between said inner and outer door panels and including a pair of parallel spaced toothed racks and a support bracket supporting a pair of pinions in driving engagement with said pair of spaced racks;

a window mounted to said support bracket, said window including a top edge, a front edge, a rear edge and a bottom edge, one of said front and rear edges being angled so as to generally correspond with a first pillar angle, said first pillar angle being greater than zero degrees from vertical and said bottom edge being generally horizontal, wherein said pair of racks are mounted generally parallel to said first pillar angle and said window is mounted to said support bracket via a pair of mount brackets, one of said mount brackets being longer than the other to accommodate for said first pillar angle.

18. A window lift mechanism, comprising:

- a support bracket;
- a drive motor supported on said support bracket;
- a first pinion rotatably driven by said drive motor, said first pinion engaging a first rack;
- a second pinion rotatably driven by said first pinion, said second pinion engaging a second rack, whereby rotation of said motor causes movement of said support bracket relative to said first and second racks, wherein at least one of said support bracket and said first and second racks is made from a statically dissipative plastic composite material.

19. The window lift mechanism according to claim 18, wherein said first and second pinions are made from a statically dissipative plastic composite material.